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EXAMINER	
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ART UNIT	**PAPER NUMBER**
2631	4

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/687,024	LINDSEY ET AL.
	Examiner	Art Unit
	Kevin M Burd	2631

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 February 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-97* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-97* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04 February 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. This office action, in response to the amendment filed 2/4/2004, is as final office action.

Response to Arguments

2. The objections to the drawings are maintained and restated below. Corrected drawings are required. Applicant submitted a drawing in non-permanent ink on what appears to be a piece of yellow legal pad paper. This drawing is unacceptable.

3. The previous objection to the abstract has been withdrawn.

4. Applicant's arguments filed 2/4/2004 have been fully considered but they are not persuasive. Applicant discloses numerous arguments discussing the claims. These arguments will be addressed using the same numbers presented in the response filed 10/13/2003.

3-4. The previous objections to the claims are withdrawn.

6.a. Tanaka does disclose a parallel presentation of the modulated and spread signals. A plurality of parallel branches, each modulating and spreading a signal, are shown in figure 2.

6.b. For each branch, an individual modulation and individual spreading code is selected for each signal. These elements are combined as described in the previous office action and is stated in column 2, lines 21-41.

6.c. For each branch, an individual modulation and individual spreading code is selected for each signal. These elements are combined as described in the previous office action and is stated in column 2, lines 21-41.

6.d. For each branch, an individual modulation and individual spreading code is selected for each signal. These elements are combined as described in the previous office action and is stated in column 2, lines 21-41. The product is the outputted signal.

6.e. Tanaka shows the output signal is sent to the antenna shown in figure 2.

7. The rejections of the claims are maintained for the reasons stated above and in the previous office action.

8. The rejections of the claims are maintained for the reasons stated above and in the previous office action. The previous rejections of claims 41 and 42 addresses the generation of a product that comprises a modulated, spread signal of punctured and interleaved data.

9. The rejections of the claims are maintained. Applicant fails to present persuasive arguments as to the allowability of the claims.

10. Tanaka discloses the features as stated above and in the previous rejections. Lee discloses the use of the filters as stated in claims 61-63 and 66

11-12. The rejections of the claims are maintained for the reasons stated above. The amendment to claim 67 necessitates a new rejection which is stated below.

13-14. The claims are rejected for the reasons stated above. The signal is modulated with a selected modulation and spread with a selected spread code as explained above and in the previous office action.

15. The rejections of claims 75-97 are stated below.

New claim objections are necessitated by the amendment and are stated below.

Drawings

5. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the plurality of integrators and the plurality of squaring stages must be shown or the features canceled from the claims. No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

6. Claims 84 and 95 are objected to because of the following informalities: claim 84, line 6, the term "datam" is present. Claim 95, line the phrase "the spreading a code" is present. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-18, 21, 29-34, 43, 44, 47, 49, 51, 54-57, 59, 75-79, 84-90 and 95-97 are rejected under 35 U.S.C. 102(b) as being anticipated by Tanaka et al (US 5,781,542).

Regarding claims 1, 55 and 84, Tanaka discloses a method of transmitting data from a transmitter to a receiver (figure 2). A plurality of types of multi-valued modulation systems having different numbers of multi-valued modulations is determined (column 2, lines 29-32). A number of different spreading codes from a plurality of spreading codes are determined (column 2, lines 35-41). A parallel presentation of the individual sequence to be modulated and spread is shown in figure 2. Each signal is selectively modulated (column 5, lines 7-12) and then spread using one of the spreading codes (column 11, lines 50-52). Each spreading code is unique for every user.

Regarding claims 2 and 56, each sequences is modulated by one of the modulations and then spread by one of the spreading codes (column 2, lines 21-41 and figure 2).

Regarding claim 3, this modulated and spread signal is transmitted (figure 2).

Regarding claim 4, the modulation types that are selected are BPSK, QPSK, 8PSK and 16PSK (column 5, lines 7-12) and 16 different spread codes are provided.

Regarding claim 5, each sequences is modulated by one of the modulations and then spread by one of the spreading codes (column 2, lines 21-41 and figure 2).

Regarding claims 6 and 87, Tanaka discloses a method of transmitting data from a transmitter to a receiver (figure 2). An input is provided to a dividing section and an encoding section shown on figure 2. The sequence of symbols is input to a modulation section. A plurality of types of multi-valued modulation systems having different

numbers of multi-valued modulations (M) is determined (column 2, lines 29-32). A number of different spreading codes from a plurality of spreading codes (N) are determined (column 2, lines 35-41). A parallel presentation of the individual sequence to be modulated and spread is shown in figure 2. Each signal is selectively modulated (column 5, lines 7-12) and then spread using one of the spreading codes (column 11, lines 50-52). Each spreading code is unique for every user.

Regarding claim 7, each sequences is modulated by one of the modulations and then spread by one of the spreading codes (column 2, lines 21-41 and figure 2).

Regarding claims 8 and 88, this modulated and spread signal is transmitted (figure 2).

Regarding claims 9, 10 and 89, a parallel presentation of the individual sequence to be modulated and spread is shown in figure 2. The sequence is selectively modulated and spread.

Regarding claim 11, the modulation types that are selected are BPSK, QPSK, 8PSK and 16PSK (column 5, lines 7-12) and 16 different spread codes are provided.

Regarding claim 12, Tanaka discloses a method of transmitting data from a transmitter to a receiver (figure 2). An input is provided to a dividing section and an encoding section shown on figure 2. The sequence of symbols is input to a modulation section. A plurality of types of multi-valued modulation systems having different numbers of multi-valued modulations (M) is determined (column 2, lines 29-32). A number of different spreading codes from a plurality of spreading codes (N) are determined (column 2, lines 35-41). A parallel presentation of the individual sequence to

be modulated and spread is shown in figure 2. Each signal is selectively modulated (column 5, lines 7-12) and then spread using one of the spreading codes (column 11, lines 50-52). Each spreading code is unique for every user.

Regarding claim 13, each of the parallel paths selects a modulation and a spreading code and this modulated, spread data sequence is transmitted (column 4, lines 5-28).

Regarding claims 14, 29 and 33, Tanaka discloses a method of transmitting data from a transmitter to a receiver (figure 2). An input is provided to a dividing section and an encoding section shown on figure 2. The sequence of symbols is input to a modulation section. A plurality of types of multi-valued modulation systems having different numbers of multi-valued modulations (M) is determined (column 2, lines 29-32). A number of different spreading codes from a plurality of spreading codes (N) are determined (column 2, lines 35-41). A parallel presentation of the individual sequence to be modulated and spread is shown in figure 2. Each signal is selectively modulated (column 5, lines 7-12) and then spread using one of the spreading codes (column 11, lines 50-52). Each spreading code is unique for every user.

Regarding claims 15 and 30, each sequences is modulated by one of the modulations and then spread by one of the spreading codes (column 2, lines 21-41 and figure 2).

Regarding claim 16, Tanaka further discloses a receiver stage as shown in figure 2. The receiver divides the signal into m pieces. The signals are despread (column 4,

lines 28-37). After dispreading, the signal is demodulated using the previously selected -modulation type (column 4, lines 37-42).

Regarding claims 17 and 31, the data is demodulated using the appropriate demodulation type (column 4, lines 37-42).

Regarding claims 18 and 32, the data is despread using the appropriate despreading code (column 4, lines 32-37).

Regarding claims 21 and 90, Tanaka discloses a method of transmitting data from a transmitter to a receiver (figure 2). An input is provided to a dividing section and an encoding section shown on figure 2. The sequence of symbols is input to a modulation section. A plurality of types of multi-valued modulation systems having different numbers of multi-valued modulations (M) is determined (column 2, lines 29-32). A number of different spreading codes from a plurality of spreading codes (N) are determined (column 2, lines 35-41). A parallel presentation of the individual sequence to be modulated and spread is shown in figure 2. Each signal is selectively modulated (column 5, lines 7-12) and then spread using one of the spreading codes (column 11, lines 50-52). Each spreading code is unique for every user. Tanaka further discloses a receiver stage as shown in figure 2. The receiver divides the signal into m pieces. The signals are despread (column 4, lines 28-37). After dispreading, the signal is demodulated using the previously selected -modulation type (column 4, lines 37-42).

Regarding claim 34, the data is encoded at the transmitter and decoded at the receiver as shown in figure 2. The controller 20 ensures the data is decoded properly (figure 2).

Regarding claims 43, 51 and 54, Tanaka discloses an apparatus for transmitting data from a transmitter to a receiver (figure 2). A plurality of types of multi-valued modulation systems having different numbers of multi-valued modulations is determined (column 2, lines 29-32). A number of different spreading codes from a plurality of spreading codes are determined (column 2, lines 35-41). A parallel presentation of the individual sequence to be modulated and spread is shown in figure 2. Each signal is selectively modulated (column 5, lines 7-12) and then spread using one of the spreading codes (column 11, lines 50-52). Each spreading code is unique for every user. The modulated and spread signal is transmitted as shown in figure 2.

Regarding claim 44, an encoder for encoding the input data is shown in figure 2.

Regarding claims 47 and 49, one of the plurality of data modulations are used on each signal as is one of a plurality of spreading codes as stated above. The controller 20 controls which data modulation and spreading code.

Regarding claim 57, the combined modulated and spread signal is transmitted as shown in figure 2.

Regarding claim 59, the input signal is encoded as shown in figure 2.

Regarding claims 75-79, 85 and 86, each sequences is modulated by one of the modulations and then spread by one of the spreading codes (column 2, lines 21-41 and figure 2). The product is the outputted signal.

Regarding claims 95 and 96, Tanaka discloses a method of transmitting data from a transmitter to a receiver (figure 2). A plurality of types of multi-valued modulation systems having different numbers of multi-valued modulations is determined (column 2,

lines 29-32). A number of different spreading codes from a plurality of spreading codes are determined (column 2, lines 35-41). A parallel presentation of the individual sequence to be modulated and spread is shown in figure 2. Each signal is selectively modulated (column 5, lines 7-12) and then spread using one of the spreading codes (column 11, lines 50-52). Each spreading code is unique for every user. Each sequences is modulated by one of the modulations and then spread by one of the spreading codes (column 2, lines 21-41 and figure 2). The product is the outputted signal.

Regarding claim 97, the receiver for receiving the modulated and spread signal is shown in figure 2.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 19, 20, 22-24, 80-83, 91 and 92 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (US 5,781,542) in view of Fulghum (US 5,345,469).

Regarding claims 19, 20, 22, 23, 80, 81, 83, 91 and 92, Tanaka discloses the method stated above in paragraph 7. Tanaka discloses the signal is despread and demodulated when identified by the controller 20. Tanaka does not disclose identifying

the spreading code by correlating the received signal. Fulghum discloses using adaptable matched filters to provide a correlation to determine which of the spreading codes is the most optimum to use. This determines which is in use (column 3, line 63 to column 4, line 16). The use of matched filters is well known in CDMA systems (column 3, lines 64-65). They are easy and inexpensive to implement and for these reasons, it would have been obvious for one of ordinary skill in the art at the time of the invention to use the matched filter correlation system of Fulghum in the method of Tanaka.

Regarding claims 24 and 82, Fulghum discloses the output of the adaptable matched filters is squared and integrated as shown in figure 2.

9. Claims 25-28, 41, 42, 93 and 94 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park (US 6,160,840) in view of Tanaka et al (US 5,781,542).

Regarding claims 25 and 93, Park discloses a method of transmitting data shown in figure 1. The input signal is encoded (111), punctured (115), modulated (121) and spread (119). This output data is then transmitted (column 1, lines 38-48 and line 66 to column 2, line 4). Park does not disclose modulating the interleaved data then spreading the signal prior to transmission. Tanaka discloses modulating the data using one of a plurality of data modulations prior to using one of a plurality of spreading codes (column 2, lines 29-41). The method of Tanaka allows an information system to transmit information at high speeds with high quality even when spread codes of necessary number cannot be obtained (column 2, lines 16-20). For this reason, it would have been

obvious for one of ordinary skill in the art at the time of the invention to utilize the method of transmitting data of Tanaka in the method of Park.

Regarding claims 26 and 28, Tanaka further discloses plurality of types of multi-valued modulation systems having different numbers of multi-valued modulations is determined (column 2, lines 29-32). A number of different spreading codes from a plurality of spreading codes are determined (column 2, lines 35-41). A parallel presentation of the individual sequence to be modulated and spread is shown in figure 2. Each signal is selectively modulated (column 5, lines 7-12) and then spread using one of the spreading codes (column 11, lines 50-52). Each spreading code is unique for every user.

Regarding claims 27 and 94, each sequences is modulated by one of the data modulations and then spread by one of the spreading codes (column 2, lines 21-41 and figure 2).

Regarding claim 41, Park discloses a method of receiving transmitted data as shown in figure 2. The RDATA signal is despread (213), demodulated (211), de-interleaved (215) and de-punctured (311). This output data is then processed by down stream elements (column 2, lines 5-31). Park does not disclose despreading the received signal prior to demodulation. Tanaka discloses dispreading the data using one of a plurality of dispreading codes prior to using one of a plurality of demodulation codes (column 4, lines 28-51). The method of Tanaka allows an information system to transmit information at high speeds with high quality even when spread codes of necessary number cannot be obtained (column 2, lines 16-20). For this reason, it would have been

obvious for one of ordinary skill in the art at the time of the invention to utilize the method of receiving and processing data of Tanaka in the method of Park.

Regarding claim 42, the controller 20 identifies which of the dispreading codes to apply to the received signal and which of the data demodulations to use to demodulate the despread signal (column 4, lines 28-51).

10. Claims 35-40, 45, 46, 48, 50, 52, 53, 58, 60 and 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (US 5,781,542) in view of Park (US 6,160,840).

Regarding claim 35, Tanaka discloses the method stated above in paragraph 7. Tanaka does not disclose puncturing the data at the transmitter. Park discloses in figure 1, puncturing the data prior to transmission. By puncturing the data signal, a secondary data signal can be input to the primary signal. This signal can later be recovered and the receiver (column 1, lines 14-38). It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the data puncturing method of Park into the method of Tanaka. The punctured data cause a receiver to correct for errors and recover the data in its original form to obtain a desired symbol rate (column 1, lines 23-38).

Regarding claim 36, Tanaka discloses the method stated above in paragraph 7. Tanaka does not disclose puncturing the data at the transmitter. Park discloses in figure 1, puncturing the data prior to transmission. The signal is de-punctured in the receiver (figure 2). By puncturing the data signal, a secondary data signal can be input to the

primary signal. This signal can later be recovered at the receiver (column 1, lines 14-38). It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the data puncturing method of Park into the method of Tanaka. The punctured data cause a receiver to correct for errors and recover the data in its original form to obtain a desired symbol rate (column 1, lines 23-38).

Regarding claim 37, Tanaka discloses the method stated above in paragraph 7. Tanaka does not disclose puncturing the data at the transmitter or de-puncturing the data after demodulation and dispreading has occurred. Park discloses in figure 1, puncturing the data prior to transmission. The signal is de-punctured in the receiver (figure 2). By puncturing the data signal, a secondary data signal can be input to the primary signal. This signal can later be recovered at the receiver (column 1, lines 14-38). It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the data puncturing method of Park into the method of Tanaka after dispreading and demodulation has occurred. The punctured data cause a receiver to correct for errors and recover the data in its original form to obtain a desired symbol rate (column 1, lines 23-38).

Regarding claim 38, Tanaka discloses the method stated above in paragraph 7. Tanaka does not disclose puncturing and interleaving the data at the transmitter. Park discloses in figure 1, puncturing and interleaving the data prior to transmission. The signal is de-punctured in the receiver (figure 2). By puncturing and interleaving the data signal, a secondary data signal can be input to the primary signal. This signal can later be recovered at the receiver (column 1, lines 14-38). It would have been obvious for one

of ordinary skill in the art at the time of the invention to incorporate the data puncturing and interleaving method of Park into the method of Tanaka. The punctured data cause a receiver to correct for errors and recover the data in its original form to obtain a desired symbol rate (column 1, lines 23-38).

Regarding claim 39, Tanaka discloses the method stated above in paragraph 7. Tanaka does not disclose puncturing and interleaving the data at the transmitter. Park discloses in figure 1, puncturing and interleaving the data prior to transmission. The signal is de-punctured in the receiver (figure 2). By puncturing and interleaving the data signal, information can be removed from the signal. This information can later be recovered at the receiver (column 1, lines 14-38). It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the data puncturing and interleaving method of Park into the method of Tanaka. The punctured data cause a receiver to correct for errors and recover the data in its original form to obtain a desired symbol rate (column 1, lines 23-38).

Regarding claim 40, Tanaka discloses dispreading the received data according to one of the plurality of spreading codes and demodulating according to one of the data modulations (column 4, lines 28-51) to recover the original signal.

Regarding claims 45, 48 and 53, Tanaka discloses the method stated above in paragraph 7. Tanaka does not disclose interleaving the data at the transmitter. Park discloses in figure 1, interleaving the data prior to transmission. By interleaving the data signal, the order of the signal can be changed. If an error were to occur, instead of consecutive symbols being affected, non-consecutive information would be corrupted

allowing data correction to have a chance of recovering the original data. It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the data interleaving method of Park into the method of Tanaka for the reason stated above.

Regarding claim 46, Tanaka discloses the method stated above in paragraph 7. Tanaka does not disclose puncturing the data at the transmitter. Park discloses in figure 1, puncturing the data prior to transmission. By puncturing the data signal, a secondary data signal can be input to the primary signal. This signal can later be recovered and the receiver (column 1, lines 14-38). It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the data puncturing method of Park into the method of Tanaka. The punctured data cause a receiver to correct for errors and recover the data in its original form to obtain a desired symbol rate (column 1, lines 23-38).

Regarding claim 50, Tanaka discloses the method stated above in paragraph 7. Tanaka does not disclose puncturing the data at the transmitter. Park discloses in figure 1, puncturing and interleaving the data prior to transmission. By puncturing and interleaving the data signal, a secondary data signal can be input to the primary signal. This signal can later be recovered and the receiver (column 1, lines 14-38). It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the data puncturing and interleaving method of Park into the method of Tanaka. The punctured and interleaved data cause a receiver to correct for errors and

recover the data in its original form to obtain a desired symbol rate (column 1, lines 23-38).

Regarding claims 52, 58 and 60, Tanaka discloses the method stated above in paragraph 7. Tanaka does not disclose puncturing the data at the transmitter. Park discloses in figure 1, puncturing the data prior to transmission. The signal is de-punctured in the receiver (figure 2). By puncturing the data signal, information can be removed from the signal. This information can later be recovered at the receiver (column 1, lines 14-38). It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the data puncturing method of Park into the method of Tanaka. The punctured data cause a receiver to correct for errors and recover the data in its original form to obtain a desired symbol rate (column 1, lines 23-38).

Regarding claim 67, the apparatus of the of Tanaka is disclosed above in paragraph 7. The combination does not disclose the use of a de-puncturer and a de-inteleaver in the receiver for restoring portions of removed data. Park discloses in figure 1, puncturing the data prior to transmission. The signal is de-punctured in the receiver (figure 2). By puncturing the data signal, information can be removed from the signal. This information can later be recovered at the receiver (column 1, lines 14-38). It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the data puncturing apparatus of Park into the apparatus of Tanaka. The punctured data cause a receiver to correct for errors and recover the data in its original form to obtain a desired symbol rate (column 1, lines 23-38). Park, also, discloses in

figure 1, interleaving the data prior to transmission. By interleaving the data signal, the order of the signal can be changed. If an error were to occur, instead of consecutive symbols being affected, non-consecutive information would be corrupted allowing data correction to have a chance of recovering the original data. It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the data interleaving apparatus of Park into the apparatus of Tanaka for the reason stated above.

11. Claims 61-63 and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (US 5,781,542) in view of Lee et al (US 6,111,868).

Regarding claim 61, Tanaka discloses an apparatus for transmitting data from a transmitter to a receiver (figure 2). A plurality of types of multi-valued modulation systems having different numbers of multi-valued modulations is determined (column 2, lines 29-32). A number of different spreading codes from a plurality of spreading codes are determined (column 2, lines 35-41). A parallel presentation of the individual sequence to be modulated and spread is shown in figure 2. Each signal is selectively modulated (column 5, lines 7-12) and then spread using one of the spreading codes (column 11, lines 50-52). Each spreading code is unique for every user. Tanaka does not disclose using a plurality of matched filters to correlate the received signal.

Lee discloses using a plurality of matched filters to determine if one of the outputs of the matched filters has a value higher than a critical value (column 1, lines 24-40). This comparison is done in the decision unit 12 shown in figure 1. This process

reduces the average acquisition time as compared to serial acquisition systems 9column 1, lines 36-40). For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine the filter arrangement of Lee into the apparatus of Tanaka to obtain the correct spread signal at the receiver quickly.

Regarding claim 62, Tanaka discloses the receiver despreads the signal using the appropriate spreading code (column 4, lines 28-51).

Regarding claim 63, Tanaka discloses the receiver demodulates the signal using the appropriate demodulation (column 4, lines 28-51).

Regarding claim 66, Tanaka discloses a decoder for decoding the received signal (figure 2).

12. Claims 64 and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (US 5,781,542) in view of Lee et al (US 6,111,868) further in view of Park (US 6,160,840).

Regarding claim 64, the apparatus of the combination of Tanaka and Lee is disclosed above in paragraph 11. The combination does not disclose the use of a de-puncturer in the receiver for restoring portions of removed data. Park discloses in figure 1, puncturing the data prior to transmission. The signal is de-punctured in the receiver (figure 2). By puncturing the data signal, information can be removed from the signal. This information can later be recovered at the receiver (column 1, lines 14-38). It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the data puncturing apparatus of Park into the apparatus of Tanaka and

Lee. The punctured data cause a receiver to correct for errors and recover the data in its original form to obtain a desired symbol rate (column 1, lines 23-38).

Regarding claim 65, the apparatus of the combination of Tanaka and Lee is disclosed above in paragraph 11. The combination does not disclose the use of a de-interleaving. Park discloses in figure 1, interleaving the data prior to transmission. By interleaving the data signal, the order of the signal can be changed. If an error were to occur, instead of consecutive symbols being affected, non-consecutive information would be corrupted allowing data correction to have a chance of recovering the original data. It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the data interleaving apparatus of Park into the apparatus of Tanaka and Lee for the reason stated above.

13. Claims 68-70 and 73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (US 5,781,542) in view of Lee et al (US 6,111,868) further in view of Fulghum (US 5,345,469).

Regarding claim 61, Tanaka discloses an apparatus for transmitting data from a transmitter to a receiver (figure 2). A plurality of types of multi-valued modulation systems having different numbers of multi-valued modulations is determined (column 2, lines 29-32). A number of different spreading codes from a plurality of spreading codes are determined (column 2, lines 35-41). A parallel presentation of the individual sequence to be modulated and spread is shown in figure 2. Each signal is selectively modulated (column 5, lines 7-12) and then spread using one of the spreading codes

(column 11, lines 50-52). Each spreading code is unique for every user. Tanaka does not disclose using a plurality of matched filters to correlate the received signal.

Lee discloses using a plurality of matched filters to determine if one of the outputs of the matched filters has a value higher than a critical value (column 1, lines 24-40). This comparison is done in the decision unit 12 shown in figure 1. This process reduces the average acquisition time as compared to serial acquisition systems (column 1, lines 36-40). For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine the filter arrangement of Lee into the apparatus of Tanaka to obtain the correct spread signal at the receiver quickly.

The combination of Tanaka and Lee does not disclose a plurality of integrators, a plurality of squaring stages and a comparator for determining the largest output. However, Fulghum discloses a serial matched filter arrangement where the output of each matched filter is squared and integrated (figure 2). This value is stored until all codes have been processed and the codes are compared to determine the optimum spreading code (column 3, line 63 to column 4, line 29). This serial method is time consuming. It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the integrating and squaring method of Fulghum in the parallel matched filter arrangement of the combination of Tanaka and Lee to speed up the comparison to determine the optimum spreading code.

Regarding claim 69, Tanaka discloses the dispreading circuit shown in figure 2.

Regarding claim 70, Tanaka discloses the demodulator circuit shown in figure 2.

Regarding claim 73, Tanaka discloses the decoding circuit shown in figure 2.

14. Claims 71, 72 and 74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (US 5,781,542) in view of Lee et al (US 6,111,868) further in view of Fulghum (US 5,345,469) in view of Park (US 6,160,840).

Regarding claim 71, the apparatus of the combination of Tanaka, Lee and Fulghum is disclosed above in paragraph 13. The combination does not disclose the use of a de-puncturer in the receiver for restoring portions of removed data. Park discloses in figure 1, puncturing the data prior to transmission. The signal is de-punctured in the receiver (figure 2). By puncturing the data signal, information can be removed from the signal. This information can later be recovered at the receiver (column 1, lines 14-38). It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the data puncturing apparatus of Park into the apparatus of Tanaka, Lee and Fulghum. The punctured data cause a receiver to correct for errors and recover the data in its original form to obtain a desired symbol rate (column 1, lines 23-38).

Regarding claim 72, the apparatus of the combination of Tanaka, Lee and Fulghum is disclosed above in paragraph 13. The combination does not disclose the use of a de-interleaving. Park discloses in figure 1, interleaving the data prior to transmission. By interleaving the data signal, the order of the signal can be changed. If an error were to occur, instead of consecutive symbols being affected, non-consecutive information would be corrupted allowing data correction to have a chance of recovering the original data. It would have been obvious for one of ordinary skill in the art at the

time of the invention to incorporate the data interleaving apparatus of Park into the apparatus of Tanaka, Lee and Fulghum for the reason stated above.

Regarding claim 74, the apparatus of the combination of Tanaka, Lee and Fulghum is disclosed above in paragraph 13. The combination does not disclose the use of a de-puncturer and a de-inteleaver in the receiver for restoring portions of removed data. Park discloses in figure 1, puncturing the data prior to transmission. The signal is de-punctured in the receiver (figure 2). By puncturing the data signal, information can be removed from the signal. This information can later be recovered at the receiver (column 1, lines 14-38). It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the data puncturing apparatus of Park into the apparatus of Tanaka and Lee. The punctured data cause a receiver to correct for errors and recover the data in its original form to obtain a desired symbol rate (column 1, lines 23-38). Park, also, discloses in figure 1, interleaving the data prior to transmission. By interleaving the data signal, the order of the signal can be changed. If an error were to occur, instead of consecutive symbols being affected, non-consecutive information would be corrupted allowing data correction to have a chance of recovering the original data. It would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the data interleaving apparatus of Park into the apparatus of Tanaka, Lee and Fulghum for the reason stated above.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any response to this final action should be mailed to:

Box AF
Commissioner of Patents and Trademarks
Washington, D.C. 20231

or faxed to:

(703) 872-9314, (for formal communications; please mark "EXPEDITED PROCEDURE" or for informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA. Sixth Floor (Receptionist).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Burd, whose telephone number is (703) 308-7034. The Examiner can normally be reached on Monday-Thursday from 9:00 AM - 6:00 PM.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3800.

Kevin M Burd

Kevin M. Burd
PATENT EXAMINER
3/23/04

KHAI TRAN
PATENT EXAMINER